

How to Teach Supply Chain Management using Gaming and Simulation

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Learning with Digital Gamification

Nowadays, supply chain management strives to overcome many challenges. A significant and long-standing challenge is getting different groups within the end-to-end supply chain to work better together and collaborate cross-functionally. Gamification is an effective way of demonstrating why this is so important to supply chain performance.

For many years, Cranfield University (based in the U.K. and the leading University for Supply Chain Management outside of the USA) has used a workshop-based simulation game to teach MBA students and supply chain professionals useful skills to better manage supply chains in fast-moving environments.

With the onset of Covid in 2020, it was necessary to digitalise the game for remote learning. So, Cranfield University teamed

up with Vuealta (a partner of Anaplan) but with slight unease as to whether the classroom experience could be maintained in the digital world. However, as many digitalisation stories go, the results far exceeded expectations and the learning experience was actually enhanced due to the real-time feedback and powerful simulations available using the Anaplan and Vuealta technology.

The Game: Its Purpose and Merit

Gamification is a powerful tool, and used in this context, it helps participants to understand the complexities of global supply chains. The game is played under stable demand and supply conditions to demonstrate typical fragilities in global supply chains that are caused by internal rather than external factors. These learnings are therefore amplified in the real world of increasingly challenging demand and supply conditions.



Participants interactively role-play different locations in a supply network that lacks co-ordination, visibility and network-based metrics. Various problems arise as different entities across the supply chain take locally optimal decisions driven by poor visibility of the true demand of market orders and siloed metrics that aim for efficiency at the expense of resilience and agility. This all combines to generate the infamous and feared, but poorly understood, 'bullwhip effect' where small changes in market demand amplify throughout the supply chain.

Having completed several virtual weeks of running a supply chain, typically resulting in high inventory and poor service levels, the participants then review their performance and extract lessons learned.

The Lessons

On first impression, the game appears very simple; there is only one product to deal with, customer demand is very predictable, and the network only has to deliver product from the factory to a warehouse and then to a retail branch

outlet. However, participants soon get into difficulties as they experience a number of effects caused when supply chains are not aligned, integrated and agile. This often leads to what appears to be quite irrational behaviour as participants start to 'game' the system in an attempt to get the inventory they need. While all in good humour, a 'blame culture' can quickly appear and a 'firefighting' mentality takes hold. While this may seem somewhat extreme, when playing the game with experienced supply chain professionals, it is surprising how many times they acknowledge these behaviours persist in their own operations.

Participants are then asked how they could improve their performance. A common outcome is for participants to recognise the importance of integrated planning, real-time information, collaboration and the elimination of siloes. Another key learning for participants is how and where to measure service level. Ultimately, the only important measure of service is to the final customer. Internal measures of service, while important, should all be established to meet this end goal and not made on local silo considerations.

Further, the game considers the strategic deployment of inventory. By examining and then simulating inventory strategies using Vuelta's powerful multi-echelon simulation capabilities, participants learn the optimal placement of inventory for achieving desired service while minimising inventory.

Once participants make their recommended changes to the network the game can then be re-run or re-simulated (for speed) to demonstrate the inventory reductions and improved service levels that can be achieved with a more agile supply chain. Feedback from participants is that this is a powerful learning experience, beyond anything that can be achieved with non-participative training.

The 'bullwhip effect'

Even though it is well documented, the true cost of the 'bullwhip effect' to supply chains is frequently underestimated, as self-perpetuating impacts and behavioural changes drive high inventory, poor service levels and huge volatility in order patterns. The unintuitive nature of these interactions are laid bare by the game.

Figures 1 and 2 illustrate the typical inventory and service levels achieved in rounds one and two of the game, once lessons learned have been applied. Participants struggled to achieve a 66% service level with inventory levels fluctuating between 40 and 70 in round one (see Fig. 1). However, once the lessons from round one are applied, a 100% service level is achieved with inventory stable in the mid-40s (see Fig. 2).

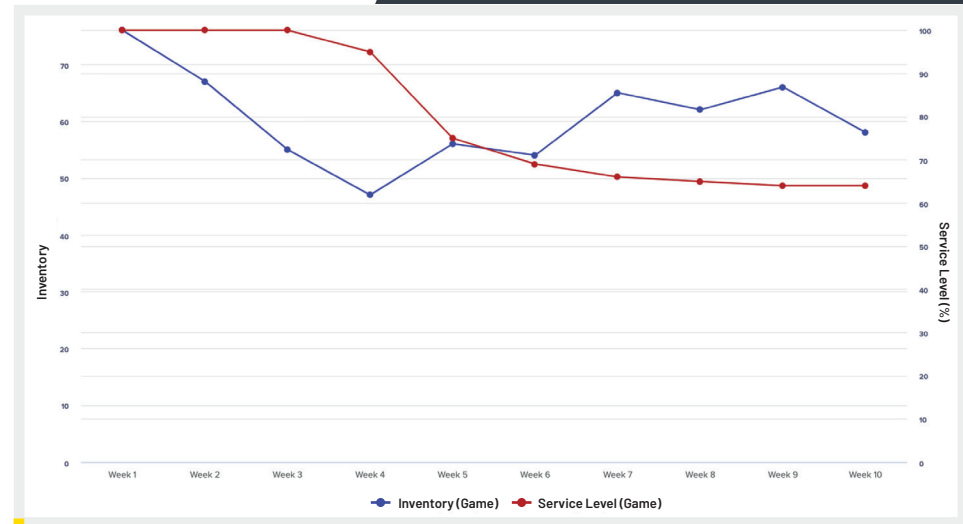


Figure 1 - Inventory v Service (Game)

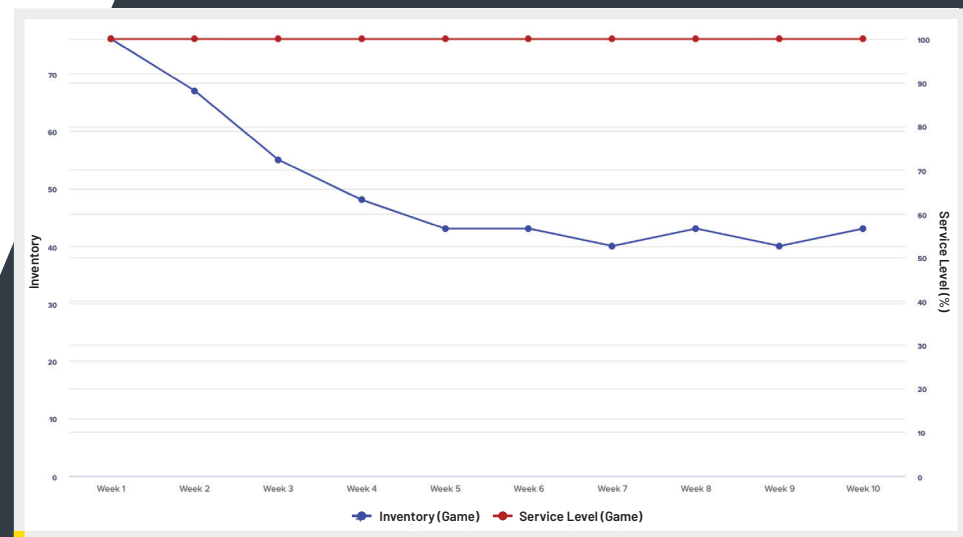


Figure 2 - Inventory v Service (Simulation)

Figure 3 highlights the bullwhip effect by showing the actual demand received at the final tier of the supply chain, the factory. Identical and stable demand entered the supply chain in both rounds but the volatility of orders on the factory in the unoptimised supply chain (round one) clearly makes factory planning difficult compared to the stable orders in round two.

The game and ensuing analysis enables all participants to understand that with simple but important changes, inventory may be lowered and adequately managed without sacrificing service.

Learned Agility

The game holds many lessons for the participants and for anyone who engages in it. Not only does it make participants aware of the value of collaboration and interaction, but it also brings forth the value of real-time data and information. This all points to key learnings that many organizations are increasingly adopting.

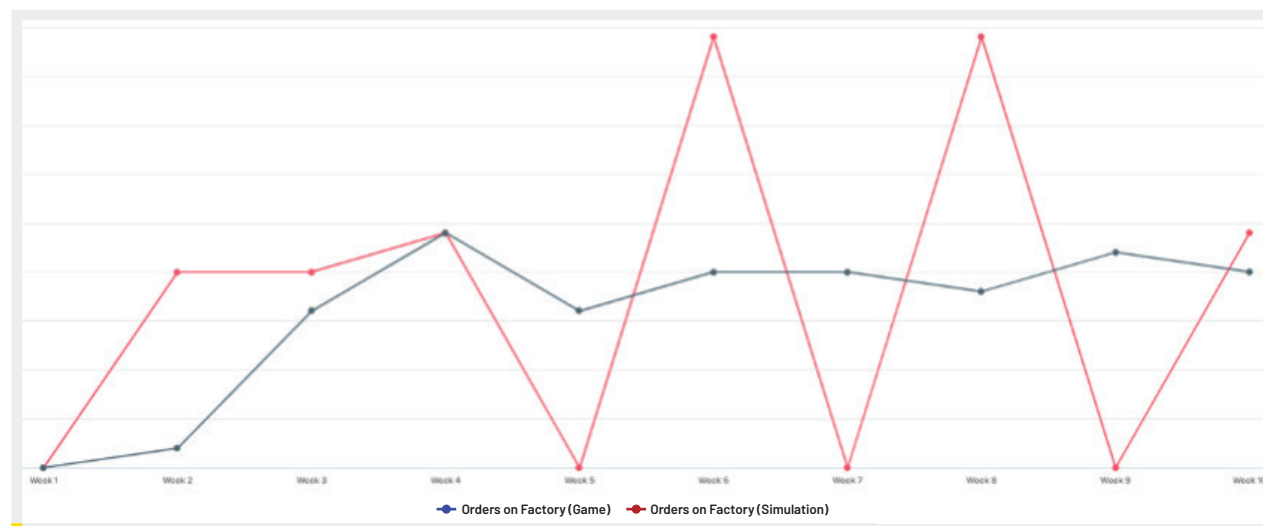


Figure 3 - Orders received by Factory: Game v Simulation

When participants completed the game, they responded with feedback that reinforced its value: "It gives us a whole picture of how supply chain management works, [and] what mistakes to avoid; highly recommended." Another stated: "It explained the concept of supply chain clearly. Additionally, we got to know

about theoretical concepts, such as, the bullwhip effect, demand variability, and the importance of having the 'one plan'."

Such feedback signals the value of gamification to boost the agility skill set that world-class leaders, who participate as real-life supply stakeholders, may benefit from.

Gamification: An Effective Way of Achieving A Healthy Supply Chain

Games and simulation educate participants in important tenets such as agility, resilience, careful planning, and the value of digital data. Learning with Cranfield, when combined with a supply chain planning platform from Vuelta and Anaplan, helps supply chain stakeholders choose to collaborate effectively with internal functions in an agile manner.

For today's supply chain - it's "game on."





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